



07820-E Sakala tänav Viiratsi Viljandi vald

Preliminary remarks

Notes on planning:

The energy consumption quantities do not take into account light scenes and their dimming levels.

Content

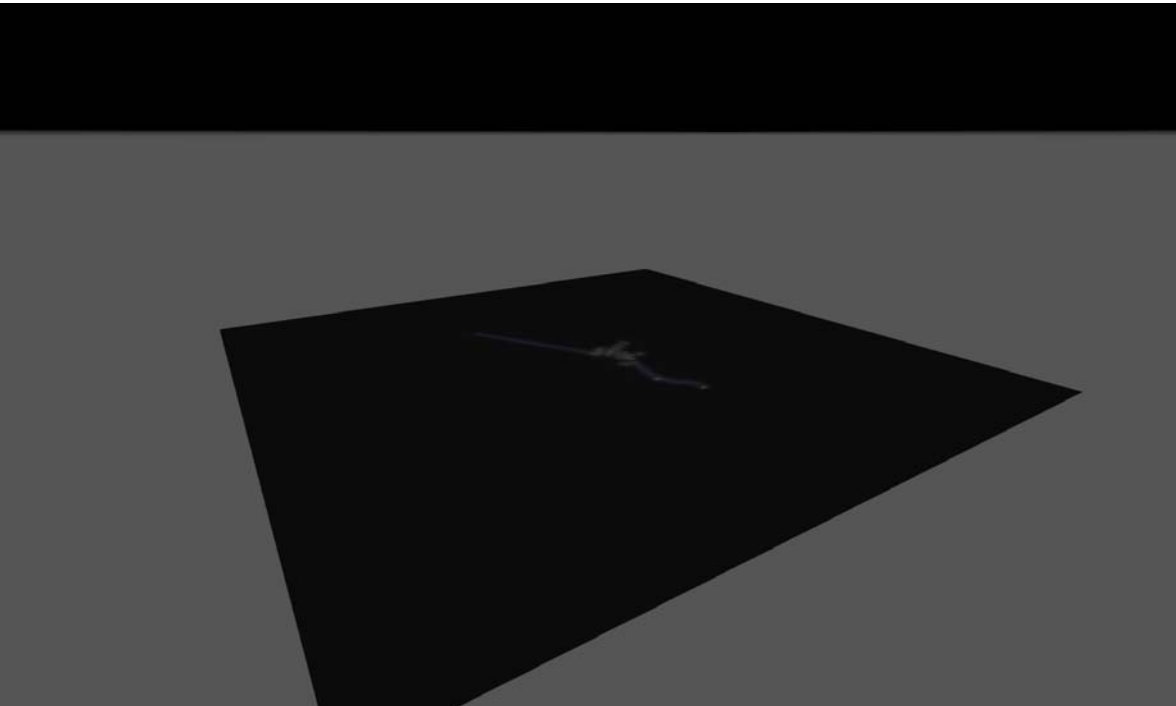
Cover page	1
Preliminary remarks	2
Content	3
Description	4
Luminaire list	5

Product data sheets

Ensto - SAGA SA30MR LED 28W/840 (1x LED 28W/840)	6
Schröder - TECEO S 5121 24 LEDs 1000mA NW 740 408622 (1x 24 LEDs 1000mA NW 740)	7
Schröder - TECEO S 5145 24 LEDs 300mA NW 740 466612 (1x 24 LEDs 300mA NW 740)	8

Site 1

Luminaire layout plan	9
Luminaire list	15
Calculation objects	16
Keskväljak Viiratsi pst / Perpendicular illuminance	18
Jalgtee Sakala tn / Perpendicular illuminance	19
Ülekäigurada pumpla juures / Perpendicular illuminance	20
Viiratsi pst jalgtee / Perpendicular illuminance	21
Vallamaja esine ülekäik / Perpendicular illuminance	22
Koolimaja esine ülekäik / Perpendicular illuminance	23
Sakala tn sõidutee / Perpendicular illuminance	24
Glossary	25



Description

Luminaire list

Φ_{total} 256206 lm	P_{total} 2323.0 W	Luminous efficacy 110.3 lm/W
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pcs.	Manufacturer	Article No.	Article name	P	Φ	Luminous efficacy
28	ENSTO	SA30MR	SAGA SA30MR LED 28W/840	28.0 W	3002 lm	107.2 lm/W
18	SCHREDER		TECEO S 5121 24 LEDs 1000mA NW 740 408622	78.0 W	8485 lm	108.8 lm/W
6	SCHREDER		TECEO S 5145 24 LEDs 300mA NW 740 466612	22.5 W	3246 lm	144.2 lm/W

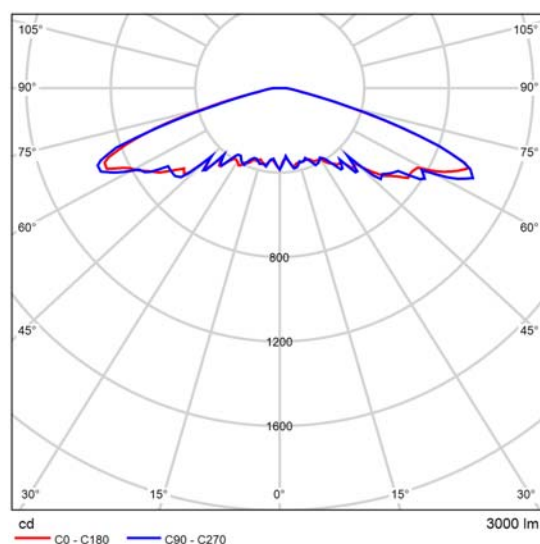
Product data sheet

ENSTO SAGA SA30MR LED 28W/840



Article No.	SA30MR
P	28.0 W
$\Phi_{\text{Luminaire}}$	3002 lm
Luminous efficacy	107.2 lm/W
CCT	4000 K
CRI	80

Ensto Saga is an outdoor luminaire, in which high quality light technical solution and design meet. Symmetric and asymmetric light distribution enables energy efficient lighting solution according to the specific needs of the project. Due to the innovative reflector solution, modern control technology and luminous efficacy Saga is an excellent choice for various surroundings.



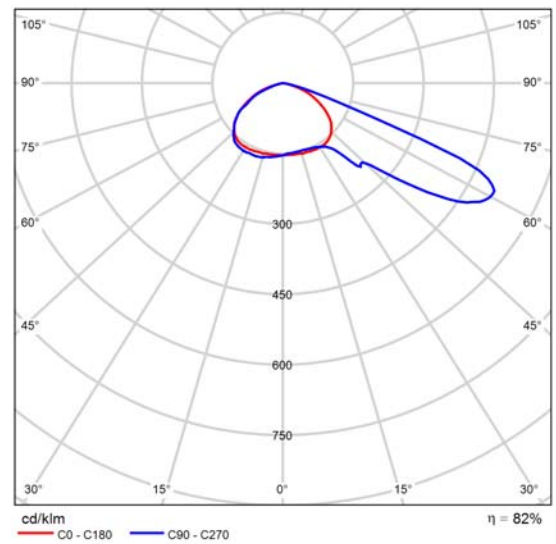
Polar LDC

Product data sheet

SCHREDER TECEO S 5121 24 LEDs 1000mA NW 740 408622



P	78.0 W
Φ_{Lamp}	10378 lm
$\Phi_{\text{Luminaire}}$	8485 lm
η	81.76 %
Luminous efficacy	108.8 lm/W
CCT	3000 K
CRI	100



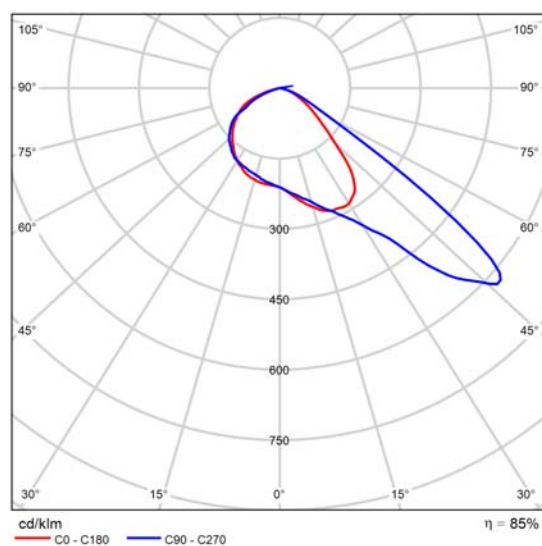
Polar LDC

Product data sheet

SCHREDER TECEO S 5145 24 LEDs 300mA NW 740 466612



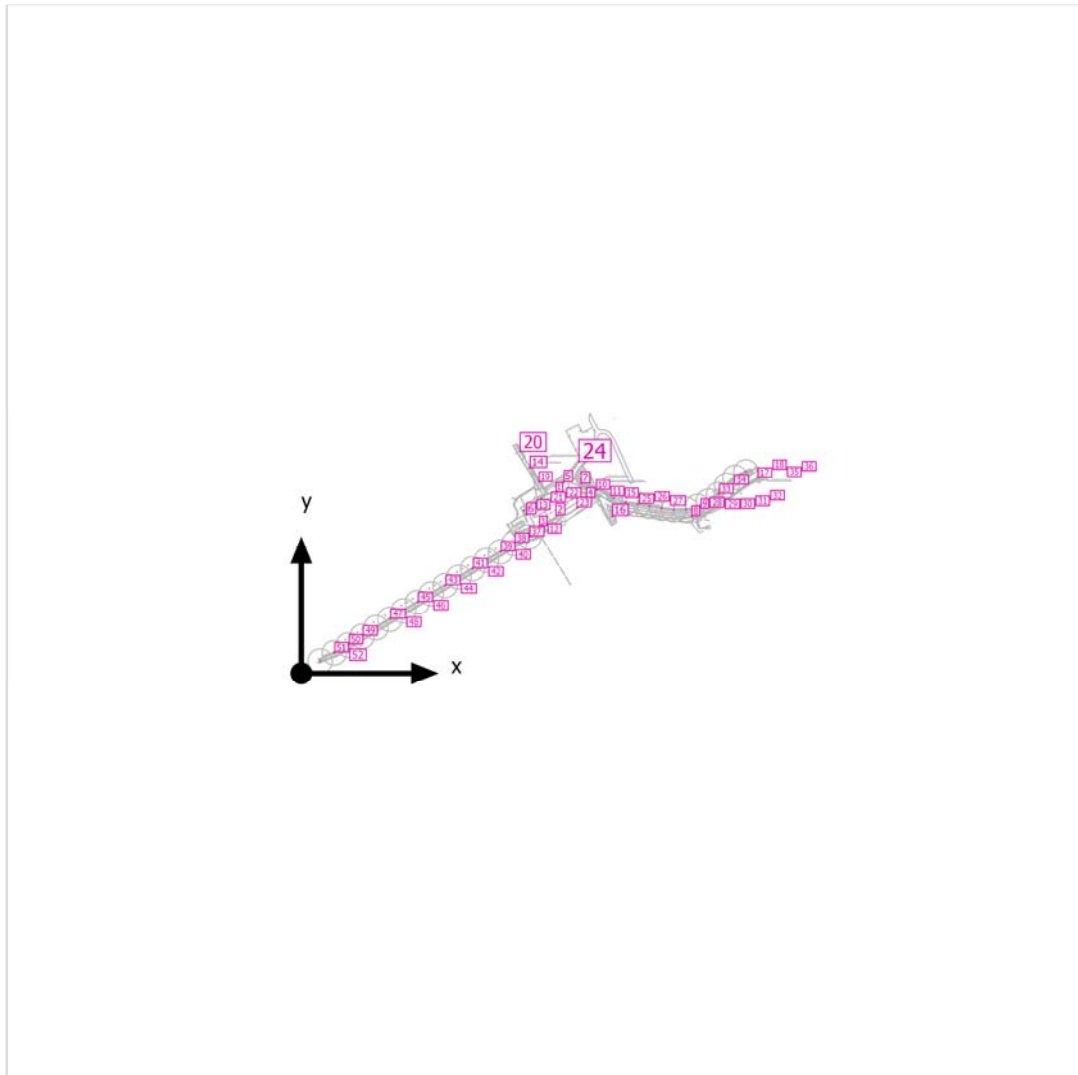
P	22.5 W
Φ_{Lamp}	3830 lm
$\Phi_{\text{Luminaire}}$	3246 lm
η	84.74 %
Luminous efficacy	144.2 lm/W
CCT	3000 K
CRI	100



Polar LDC

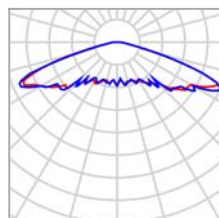
Site 1

Luminaire layout plan



Site 1

Luminaire layout plan



Manufacturer	ENSTO
Article No.	SA30MR
Article name	SAGA SA30MR LED 28W/840

Individual luminaires

X	Y	Mounting height	Luminaire
414.785 m	208.584 m	6.000 m	25
400.020 m	211.042 m	6.000 m	26
429.598 m	206.198 m	6.000 m	27
444.387 m	203.823 m	6.000 m	28
459.301 m	202.013 m	6.000 m	29
474.293 m	202.359 m	6.000 m	30
488.661 m	205.874 m	6.000 m	31
502.109 m	212.549 m	6.000 m	32
514.597 m	220.750 m	6.000 m	33
524.495 m	232.056 m	6.000 m	34
534.939 m	241.717 m	6.000 m	35
548.208 m	248.702 m	6.000 m	36
280.830 m	168.577 m	6.000 m	37
262.523 m	160.592 m	6.000 m	38

Site 1

Luminaire layout plan

X	Y	Mounting height	Luminaire
245.518 m	150.096 m	6.000 m	39
228.410 m	139.762 m	6.000 m	40
211.249 m	129.162 m	6.000 m	41
194.265 m	118.689 m	6.000 m	42
177.366 m	108.174 m	6.000 m	43
160.281 m	97.775 m	6.000 m	44
143.278 m	87.241 m	6.000 m	45
126.226 m	76.782 m	6.000 m	46
109.200 m	66.340 m	6.000 m	47
92.094 m	55.960 m	6.000 m	48
75.077 m	45.461 m	6.000 m	49
58.058 m	34.769 m	6.000 m	50
40.481 m	25.031 m	6.000 m	51
23.291 m	14.925 m	6.000 m	52

Site 1

Luminaire layout plan



Manufacturer	SCHREDER
Article name	TECEO S 5121 24 LEDs 1000mA NW 740 408622

Individual luminaires

X	Y	Mounting height	Luminaire
315.078 m	222.642 m	8.000 m	1
314.091 m	194.943 m	8.000 m	2
293.791 m	181.343 m	8.000 m	3
351.691 m	216.143 m	8.000 m	4
323.953 m	235.851 m	8.000 m	5
277.661 m	195.745 m	8.000 m	6
345.117 m	233.949 m	8.000 m	7
290.642 m	171.974 m	8.000 m	12
274.478 m	201.128 m	8.000 m	13
281.934 m	253.628 m	8.000 m	14
385.271 m	215.986 m	8.000 m	15
383.371 m	194.058 m	8.000 m	16
292.851 m	235.675 m	8.000 m	19
269.912 m	273.880 m	8.000 m	20

Site 1

Luminaire layout plan

X	Y	Mounting height	Luminaire
299.427 m	210.472 m	8.000 m	21
296.244 m	215.855 m	8.000 m	22
340.011 m	204.181 m	8.000 m	23
342.527 m	261.071 m	8.000 m	24

Site 1

Luminaire layout plan



Manufacturer	SCHREDER
Article name	TECEO S 5145 24 LEDs 300mA NW 740 466612

Individual luminaires

X	Y	Mounting height	Luminaire
481.544 m	193.769 m	6.000 m	8
482.268 m	202.502 m	6.000 m	9
363.840 m	225.880 m	6.000 m	10
358.110 m	218.094 m	6.000 m	11
563.439 m	240.928 m	6.000 m	17
563.236 m	250.564 m	6.000 m	18

Site 1

Luminaire list Φ_{total}

256206 lm

 P_{total}

2323.0 W

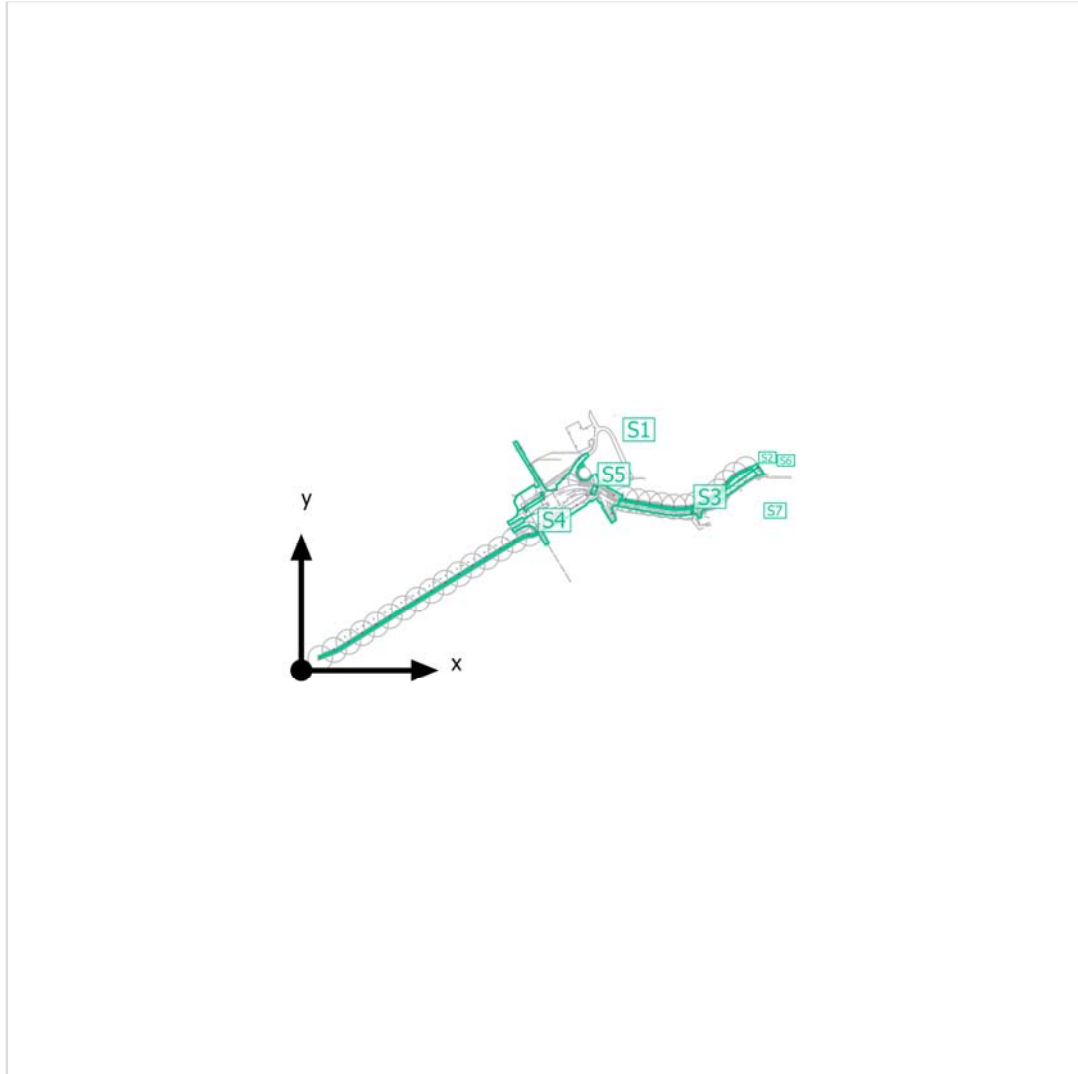
Luminous efficacy

110.3 lm/W

pcs.	Manufacturer	Article No.	Article name	P	Φ	Luminous efficacy
28	ENSTO	SA30MR	SAGA SA30MR LED 28W/840	28.0 W	3002 lm	107.2 lm/W
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Site 1

Calculation objects



Site 1

Calculation objects

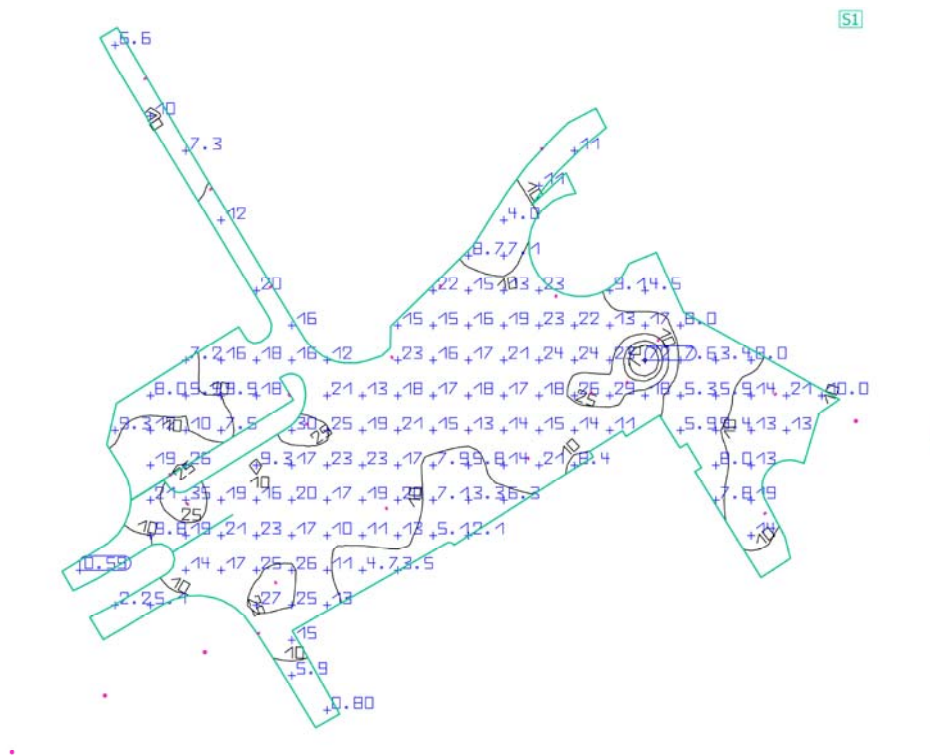
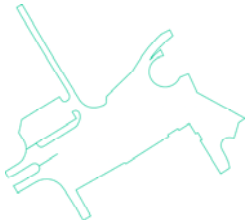
Calculation surfaces

Properties	$\bar{E}$	E_{min}	E_{max}	g_1	g_2	Index
Keskväljak Viiratsi pst Perpendicular illuminance Height: 0.000 m	14.9 lx	0.59 lx	72.1 lx	0.040	0.008	S1
Jalgtee Sakala tn Perpendicular illuminance Height: 0.000 m	9.13 lx	6.61 lx	27.5 lx	0.72	0.24	S2
Ülekäigurada pumppla juures Perpendicular illuminance Height: 0.000 m	54.8 lx	27.6 lx	73.3 lx	0.50	0.38	S3
Viiratsi pst jalgtee Perpendicular illuminance Height: 0.000 m	7.27 lx	4.87 lx	15.2 lx	0.67	0.32	S4
Vallamaja esine ülekäik Perpendicular illuminance Height: 0.000 m	44.9 lx	22.4 lx	78.0 lx	0.50	0.29	S5
Koolimaja esine ülekäik Perpendicular illuminance Height: 0.000 m	33.5 lx	4.18 lx	66.3 lx	0.12	0.063	S6
Sakala tn sõidutee Perpendicular illuminance Height: 0.000 m	8.30 lx	1.59 lx	69.6 lx	0.19	0.023	S7

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

Site 1

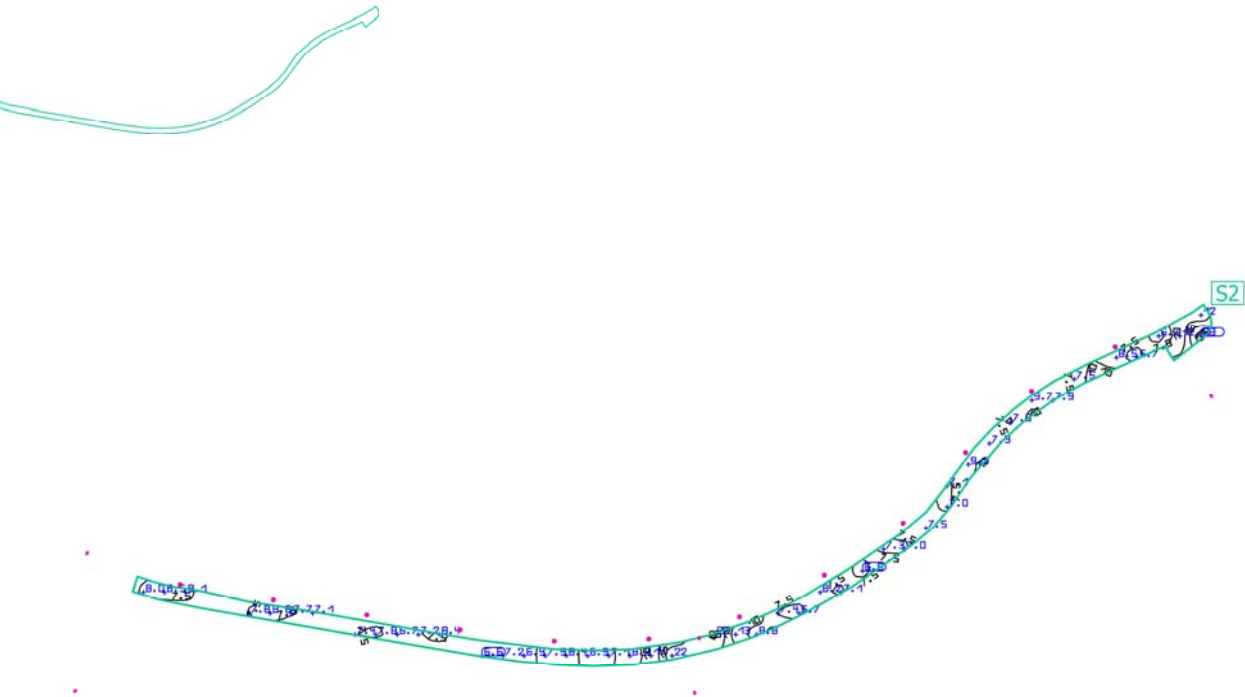
Keskväljak Viiratsi pst



Properties	$\bar{E}$	$E_{\min}$	$E_{\max}$	g_1	g_2	Index
Keskväljak Viiratsi pst Perpendicular illuminance Height: 0.000 m	14.9 lx	0.59 lx	72.1 lx	0.040	0.008	S1

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

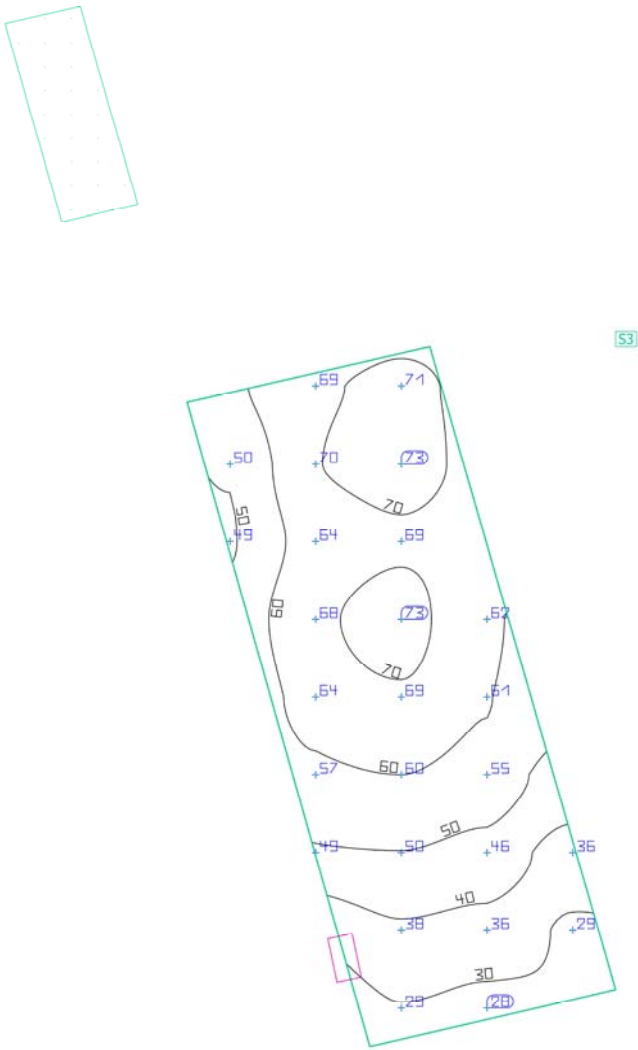
Site 1
Jalgtee Sakala tn



Properties	$\bar{E}$	E_{min}	E_{max}	g_1	g_2	Index
Jalgtee Sakala tn Perpendicular illuminance Height: 0.000 m	9.13 lx	6.61 lx	27.5 lx	0.72	0.24	S2

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

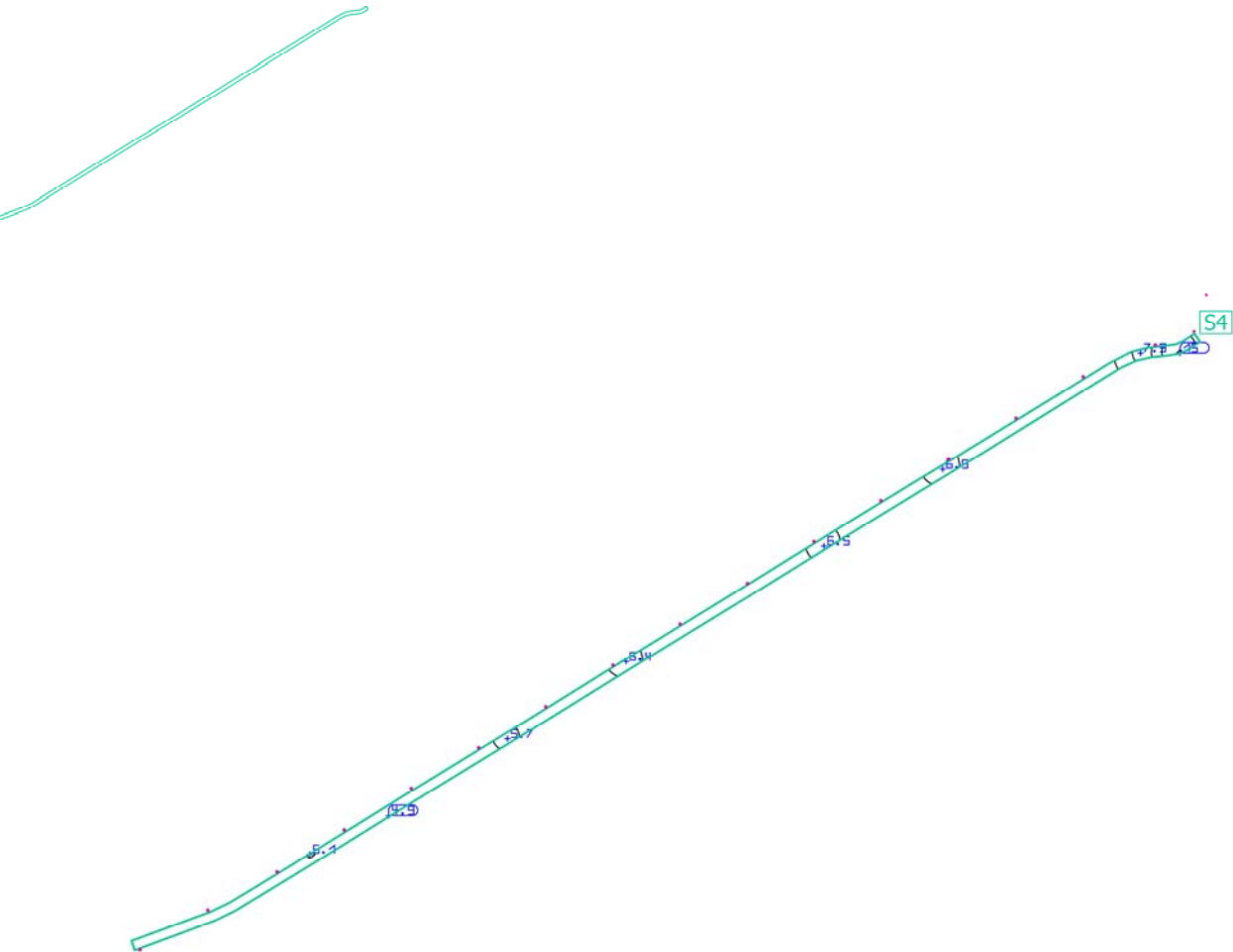
Site 1
Ülekäigurada pumpla juures



Properties	Ē	E _{min}	E _{max}	g ₁	g ₂	Index
Ülekäigurada pumpla juures Perpendicular illuminance Height: 0.000 m	54.8 lx	27.6 lx	73.3 lx	0.50	0.38	S3

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

Site 1
Viiratsi pst jalgtee

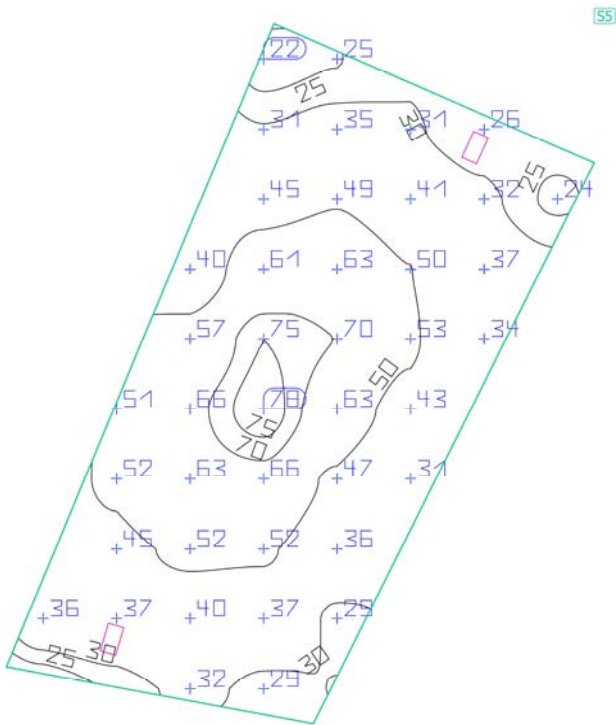


Properties	$\bar{E}$	E_{min}	E_{max}	g_1	g_2	Index
Viiratsi pst jalgtee Perpendicular illuminance Height: 0.000 m	7.27 lx	4.87 lx	15.2 lx	0.67	0.32	S4

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

Site 1

Vallamaja esine ülekäik

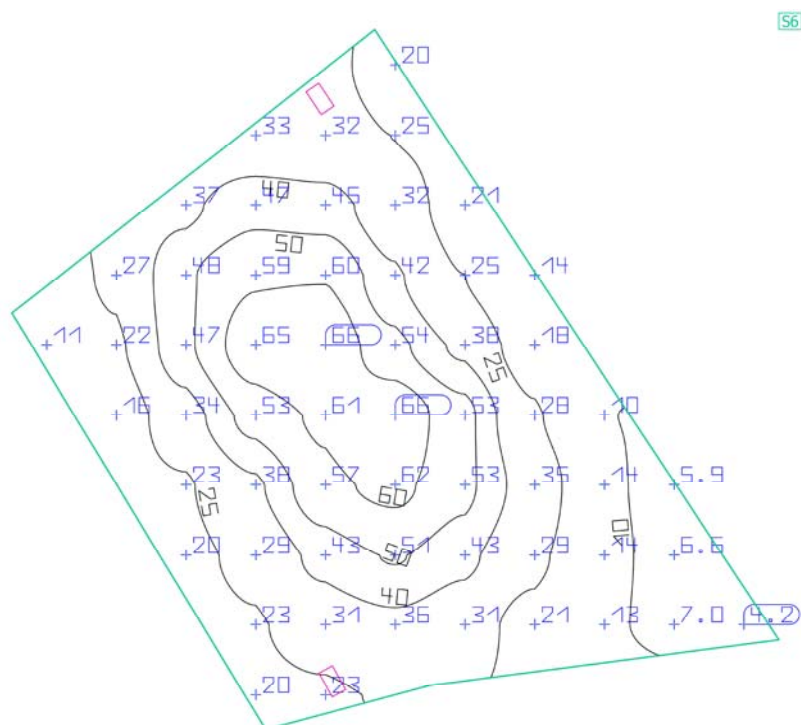
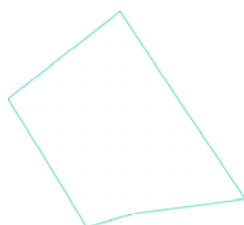


Properties	$\bar{E}$	E_{min}	E_{max}	g_1	g_2	Index
Vallamaja esine ülekäik	44.9 lx	22.4 lx	78.0 lx	0.50	0.29	S5
Perpendicular illuminance						
Height: 0.000 m						

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

Site 1

Koolimaja esine ülekäik

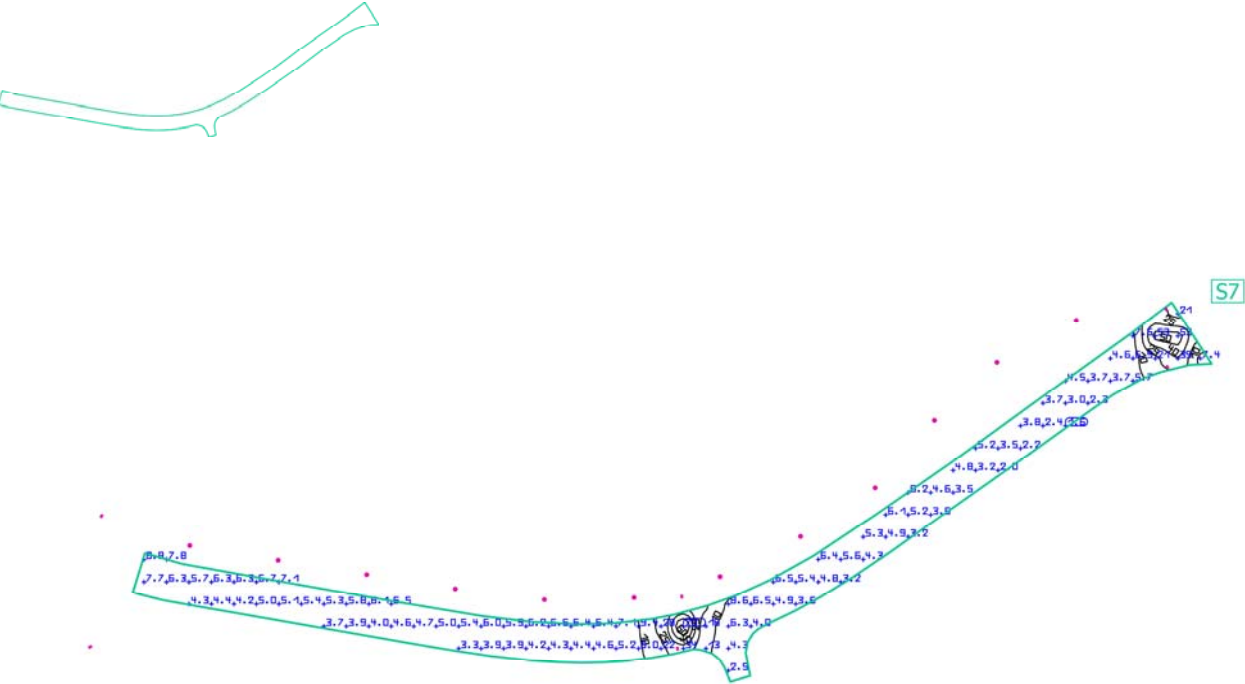


Properties	$\bar{E}$	E_{min}	E_{max}	g_1	g_2	Index
Koolimaja esine ülekäik	33.5 lx	4.18 lx	66.3 lx	0.12	0.063	S6
Perpendicular illuminance						
Height: 0.000 m						

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

Site 1

Sakala tn sõidutee



Properties	$\bar{E}$	E_{min}	E_{max}	g_1	g_2	Index
Sakala tn sõidutee Perpendicular illuminance Height: 0.000 m	8.30 lx	1.59 lx	69.6 lx	0.19	0.023	S7

Utilisation profile: DIALux presetting, Standard (outdoor transportation area)

Glossary

A

A	Formula symbol for a surface in the geometry
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B

Background area	The background area borders the direct ambient area according to DIN EN 12464-1 and reaches up to the borders of the room. In larger rooms, the background area is at least 3 m wide. It is located horizontally at floor level.
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C

CCT	(Engl. correlated colour temperature) Body temperature of a thermal radiator which serves to describe its light colour. Unit: Kelvin [K]. The lesser the numerical value the redder; the greater the numerical value the bluer the light colour. The colour temperature of gas-discharge lamps and semi-conductors are termed "correlated colour temperature" in contrast to the colour temperature of thermal radiators. Allocation of the light colours to the colour temperature ranges acc. to EN 12464-1: Light colour - colour temperature [K] warm white (ww) < 3,300 K neutral white (nw) ≥ 3,300 – 5,300 K daylight white (dw) > 5.300 K
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Clearance height	The designation for the distance between upper edge of the floor and bottom edge of the ceiling (in the completely furnished status of room).
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CRI	(Engl. colour rendering index) Designation for the colour rendering index of a luminaire or a lamp acc. to DIN 6169: 1976 or CIE 13.3: 1995. The general colour rendering index Ra (or CRI) is a dimensionless figure that describes the quality of a white light source in regards to its similarity with the remission spectra of defined 8 test colours (see DIN 6169 or CIE 1974) to a reference light source.
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D

Daylight factor	Ratio of the illuminance achieved solely by daylight incidence at a point in the inside to the horizontal illuminance in the outer area under an unobstructed sky. Formula symbol: D (Engl. daylight factor) Unit: %
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Glossary

Daylight quotient effective area	A calculation surface within which the daylight quotient is calculated.
E	
Eta (η)	(light output ratio) The light output ratio describes what percentage of the luminous flux of a free radiating lamp (or LED module) is emitted by the luminaire when installed. Unit: %
G	
g1	Often also U_o (Engl. overall uniformity) Designates the overall uniformity of the illuminance on a surface. It is the quotient from E_{min} to $\bar{E}$ and is required, for instance, in standards for illumination of workstations.
g2	Actually it designates the "non-uniformity" of the illuminance on a surface. It is the quotient of E_{min} to E_{max} and is generally only relevant for certifying the emergency lighting acc. to EN 1838.
I	
Illuminance	Describes the ratio of the luminous flux that strikes a certain surface to the size of this surface ($\text{lm/m}^2 = \text{lx}$). The illuminance is not tied to an object surface. It can be determined anywhere in space (inside or outside). The illuminance is not a product feature because it is a recipient value. Luxometers are used for measuring. Unit: Lux Abbreviation: lx Formula symbol: E
Illuminance, adaptive	For the determining of the middle adaptive illuminance on a surface, this is rastered "adaptively". In the area of large illuminance differences within the surface, the raster is subdivided finer; within lesser differences, a rougher classification is made.
Illuminance, horizontal	Illuminance that is calculated or measured on a horizontal (level) surface (this can be for example a table top or the floor). The horizontal illuminance is usually identified by the formula letter E_h.
Illuminance, perpendicular	Illuminance that is calculated or measured plumb-vertical to a surface. This needs to be taken into account for tilted surfaces. If the surface is horizontal or vertical, then there is no difference between the perpendicular and the horizontal or vertical illuminance.

Glossary

Illuminance, vertical	Illuminance that is calculated or measured on a vertical surface (this can be for example the front of some shelves). The vertical illuminance is usually identified by the formula letter E_v.
L	
LENI	(Engl. lighting energy numeric indicator) Lighting energy numeric indicator acc. to EN 15193 Unit: kWh/m² year
LLMF	(Engl. lamp lumen maintenance factor)/acc. to CIE 97: 2005 Lamp flux maintenance factor that takes the luminous flux reduction into account of a luminaire or an LED module in the course of the operating time. The lamp flux maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no luminous flux reduction existing).
LMF	(Engl. luminaire maintenance factor)/acc. to CIE 97: 2005 Luminaire maintenance factor that takes the soiling into account of the luminaire in the course of the operating time. The luminaire maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no soiling existing).
LSF	(Engl. lamp survival factor)/acc. to CIE 97: 2005 Lamp survival factor that takes the total failure into account of a luminaire in the course of the operating time. The lamp survival factor is specified as a decimal digit and can have a maximum value of 1 (no failures existing within the time concerned or prompt replacement after the failure).
Luminance	Dimension for the "brightness impression" that the human eye has of a surface. The surface itself can emit light thereby or light striking it can be reflected (emitter value). It is the only photometric value that the human eye can perceive. Unit: Candela per square metre Abbreviation: cd/m² Formula symbol: L
Luminous efficacy	Ratio of the emitted luminous flux Φ [lm] to the absorbed electrical power P [W] Unit: lm/W. This ratio can be formed for the lamp or LED module (lamp or module light output), the lamp or module with control gear (system light output) and the complete luminaire (luminaire light output).

Glossary

Luminous flux	Dimension for the total light output that is emitted from one light source in all directions. It is thus an "emitter value" that specifies the entire emitting output. The luminous flux of a light source can only be determined in a laboratory. A difference is made between the lamp or LED module luminous flux and the luminaire luminous flux. Unit: Lumen Abbreviation: lm Formula symbol: Φ
Luminous intensity	Describes the intensity of the light in a certain direction (emitter value). The luminous intensity is a matter of the luminous flux Φ that is emitted in a certain spherical angle Ω. The radiation characteristics of a light source are presented graphically in a light distribution curve (LDC). The luminous intensity is an SI base unit. Unit: Candela Abbreviation: cd Formula symbol: I
M	
Maintenance factor	See MF
MF	(Engl. maintenance factor)/acc. to CIE 97: 2005 Maintenance factor as decimal number between 0 and 1 that describes the ratio of the new value of a photometric planning parameter (e.g. of the illuminance) to a maintenance value after a certain time. The maintenance factor takes into account the soiling of luminaires and rooms as well as the luminous flux reduction and the failure of light sources. The maintenance factor is taken into account either overall or determined in detail acc. to CIE 97: 2005 by the formula $RMF \times LMF \times LLMF \times LSF$.
P	
P	(Engl. power) Electric power consumption Unit: watt Abbreviation: W
R	
Reflection factor	The reflection factor of a surface describes how much of the striking light is reflected back. The reflection factor is defined by the colour of the surface.

Glossary

RMF	(Engl. room maintenance factor)/acc. to CIE 97: 2005 Room maintenance factor that takes the soiling into account of the space encompassing surfaces in the course of the operating time. The room maintenance factor is specified as a decimal digit and can have a maximum value of 1 (no soiling existing).
S	
Surrounding area	The ambient area directly borders the area of the visual task and should be planned with a width of at least 0.5 m according to DIN EN 12464-1. It is at the same height as the area of the visual task.
U	
UGR (max)	(unified glare rating) Measure for the psychological glare effect in interiors. In addition to luminaire luminance, the UGR value also depends on the position of the observer, the viewing direction and the ambient luminance. Among other things, EN 12464-1 specifies maximum permissible UGR values for various indoor workplaces.
UGR observer	Calculation point in the room, for the DIALux the UGR value is determined. The location and height of the calculation point should correspond to the typical observer position (position and eye level of the user).
V	
Visual task area	The area that is needed for carrying out the visual task in accordance with DIN EN 12464-1. The height corresponds with the height at which the visual task is executed.
W	
Wall zone	Circumferential area between working plane and walls which is not taken into account for the calculation.
Workplane	Virtual measuring or calculation surface at the height of the visual task that generally follows the room geometry. The working plane may also feature a wall zone.